Amendments to the Claims

Please amend the claims to read as follows.

1. (Currently Amended) A method for manufacturing an optical device comprising:

moving a mask situated between a layer of optical waveguide material to be shaped and a source of etchant ions, wherein at least two areas of the optical waveguide material are exposed to variable amounts of etchant ions provided along a selected etching direction to provide ~~an~~ a rib optical waveguide having an optical axis non-parallel to the selected etching direction and having a thickness that varies along the direction of the optical axis.

2. (Original) The method of claim 1, wherein the mask has a comb shape comprising teeth.

3. (Original) The method of claim 1, wherein the mask has a comb shape and wherein the mask comprises tapered teeth.

4. (Original) The method of claim 1, wherein the mask comprises at least one slit.

5. (Original) The method of claim 1, further comprising a stationary mask.

6. (Original) A vertically tapered waveguide produced by the method of claim 1.

7. (Original) A diffraction grating produced by the method of claim 1.

8. (Original) The method of claim 1, wherein the mask moves in a linear direction with respect to the plane of the optical waveguide direction.

9. (Original) The method of claim 1, wherein the mask moves with a reciprocating motion with respect to the plane of the optical waveguide direction.

10. (Currently Amended) A method of micromachining comprising:

etching through a moving mask so that a desired sidewall shape is produced in an optical material, wherein the moving mask is a comb mask comprising tapered teeth and the motion is a reciprocating motion along a direction perpendicular to the direction along which the teeth extend.

11. (Previously Presented) An optical device comprising:

a waveguide comprising an upper surface and a lower surface, the upper surface comprising a vertically tapered portion and a non-vertically tapered portion; and

a diffraction grating disposed on the upper surface at the non-vertically tapered portion, wherein the waveguide and the diffraction grating are made from a monolithic optical material, and wherein the monolithic optical material is over a substrate common to both the waveguide and the diffraction grating, the substrate disposed adjacent to the lower surface of the waveguide.

12-13. (Canceled)

14. (Currently Amended) A method for forming a waveguide with a vertical taper, comprising the steps of:

a) forming a rib waveguide;

b) disposing a movable mask above the waveguide;

c) moving the mask along the waveguide while exposing the waveguide to an ion etching process, so that a vertical taper is formed in the waveguide.

15. (Original) The method of claim 14 wherein the waveguide comprises silicon.

16. (Previously Presented) The method of claim 14 wherein the etching process is selected from the group consisting of deep reactive ion etching, plasma etching, ion beam milling, and laser-chemical etching.

17. (Original) The method of claim 14 wherein the mask is in contact with the waveguide.

18. (Original) The method of claim 14 wherein the mask is up to 250 microns above the waveguide.

19. (Original) The method of claim 14 wherein the mask is moved a distance of 50-1000 microns.

20. (Original) The method of claim 14 wherein the depth of the taper is in the range of 0-5 microns.

21. (Original) A vertically tapered waveguide made according to the method of claim 14.

22. (Previously Presented) An optical device comprising:

a waveguide comprising an upper surface and a lower surface, the upper surface comprising a taper surface that provides a vertical taper to the waveguide; and

a diffraction grating disposed on the taper surface, wherein the waveguide and the diffraction grating are made from a monolithic optical material, and wherein the monolithic optical material is over a substrate common to both the waveguide and the diffraction grating, the substrate disposed adjacent to the lower surface of the waveguide.